



SEQUENCE LISTING

<110> Siebel, Christian
Brennan, Thomas J.

<120> Methods of Producing Cells and Animals
Comprising Targeted Gene Modifications and Compositions
Relating Thereto

<130> RMES-02

<140> US 09/954,483

<141> 2001-09-17

<150> US 60/232,957

<151> 2000-09-15

<160> 14

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 108

<212> DNA

<213> Artificial Sequence

<220>

<223> Targeting Vector

<400> 1

aaggtcctcc cgaggcccg cattctcgca cgcttcaaaa ggcgcagctct gccgcgctgt 60
tctcctcttc ctcatctccg ggcctttcga cctgcagcca atatggga 108

<210> 2

<211> 119

<212> DNA

<213> Artificial Sequence

<220>

<223> Targeting Vector

<400> 2

aaggtcctat tgtgagcgct cacaatcccg gcattctcgc aagcttcaaa agcgcacgtc 60
tgccgcgcta ttgtgagcgc tcacaattcc ggcctttcg acctgcagcc aatatggga 119

<210> 3

<211> 64

<212> DNA

<213> Artificial Sequence

<220>

<223> Targeting Vector

<400> 3

gaattcacct gccagaccat gccaaaaaag aagagaaagg tcatgaaacc agtaacgtta 60
tacg 64

<210> 4

<211> 66

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<400> 4

cggaattcac ctgccagacc atgccaaaaa agaagagaaa ggcatgaaa ccagtaacgt 60
tatacg 66

<210> 5

<211> 29

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<400> 5

cggaattctc actgcccgtt ttccagtcg 29

<210> 6

<211> 75

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<400> 6

gcattctcgc aagcttcaaa agcgcacgtc tgccgcgcta ttgtgagcgc tcacaattcc 60
gggcctttcg acctg 75

<210> 7

<211> 18

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<400> 7

tcatacaattt ctgcagac 18

<210> 8

<211> 66

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<400> 8

tgcgcttttg aagcttgcca gaatgccggg attgtgagcg ctcacaatag gaccttcgcg 60
cccgcc 66

<210> 9

<211> 17

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<400> 9

caggaaacag ctatgac

17

<210> 10

<211> 26

<212> DNA

<213> Artificial Sequence

<220>

<223> Silencer Element

<400> 10

cagaggcact ctccgtggtg ctgaaa

26

<210> 11

<211> 88

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligonucleotide Primer

<400> 11

agctttttca gcaccacgga gagtgcctct gcttttcagc accacggaga gtgcctctgc 60

ttttcagcac cacggagagt gcctctga

88

<210> 12

<211> 88

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligonucleotide Primer

<400> 12

agcttcagag gcactctccg tgggtgctgaa aagcagaggc actctccgtg gtgctgaaaa 60

gcagaggcac tctccgtggt gctgaaaa

88

<210> 13

<211> 6148

<212> DNA

<213> Artificial Sequence

<220>

<223> Construct Sequence

<400> 13

gttaactacg tcaggtggca cttttcgggg aaatgtgcgc ggaacccta tttgtttatt 60
tttctaaata cattcaaata tgtatccgct catgagacaa taaccctgat aaatgcttca 120
ataatattga aaaaggaaga gtatgagat tcaacatttc cgtgtcgccc ttattccctt 180
ttttgcgcca ttttgccctc ctgtttttgc tcaccagaa acgctggtga aagtaaaaga 240
tgctgaagat cagttgggtg cacgagtggt ttacatcgaa ctggatctca acagcggtaa 300
gacacctgag agttttcgcc ccgaagaacg ttctccaatg atgagcactt ttaaagttct 360
gctatgtggc gcggtattat cccgtgttga cgccgggcaa gagcaactcg gtcgcccgat 420
acactattct cagaatgact tggttgagta ctcaccagtc acagaaaagc atcttacgga 480
tggcatgaca gtaagagaat tatgcagtg ctcacataacc atgagtata acactgcgcc 540
caacttactt ctgacaacga tcggaggacc gaaggagcta accgcttttt tgcacaacat 600
gggggatcat gtaactcgcc ttgatcgttg ggaaccggag ctgaatgaag ccataccaaa 660
cgacgagcgt gacaccacga tgcctgtagc aatggcaaca acgttgcgca aactattaac 720

tggcgaacta	cttactctag	cttccccgga	acaattaata	gactggatgg	aggcggataa	780
agttgcagga	ccacttctgc	gctcggccct	tccggctggc	tggtttattg	ctgataaatc	840
tggagccggt	gagcgtgggt	ctcgcggtat	cattgcagca	ctggggccag	atggtaagcc	900
ctcccgtatc	gtagttatct	acacgacggg	gagtcaggca	actatggatg	aacgaaatag	960
acagatcgct	gagataggtg	cctcactgat	taagcatttg	taactgtcag	accaagttta	1020
ctcatatata	cttttagattg	atttaccccg	gttgataatc	agaaaagccc	caaaaacagg	1080
aagattgtat	aagcaaatat	ttaaattgta	aacgttaata	ttttgttaaa	attcgcgtta	1140
aatttttgtt	aaatcagctc	attttttaac	caataggccg	aaatcggcaa	aatcccttat	1200
aaatcaaaaag	aatagcccca	gatagggttg	agtgttggtc	cagtttgga	caagagtcca	1260
ctattaaaga	acgtggactc	caacgtcaaa	gggcgaaaaa	ccgtctatca	gggcgatggc	1320
ccactacgtg	aaccatcacc	caaatacaagt	tttttggggg	cgaggtgccg	taaagcacta	1380
aatcggaacc	ctaaagggag	cccccgattt	agagcttgac	ggggaaaagc	aacgtggcga	1440
gaaaggaagg	gaagaaagcg	aaaggagcgg	gcgctagggc	gctggcaagt	gtagcgggtca	1500
cgctgcgcgt	aaccaccaca	ccgcgcgcgc	ttaatgcgcc	gctacagggc	gcgtaaaagg	1560
atctaggtga	agatcctttt	tgataatctc	atgacaaaaa	tcccttaacg	tgagttttcg	1620
ttccactgag	cgtcagaccc	cgtagaaaag	atcaaaggat	cttcttgaga	tccttttttt	1680
ctgcgcgtaa	tctgctgctt	gcaaacaaaa	aaaccaccgc	taccagcggg	ggttttgttt	1740
ccggatcaag	agctaccaac	tctttttccg	aaggtaactg	gcttcagcag	agcgcagata	1800
ccaaatactg	ttctttctagt	gtagccgtag	ttaggccacc	acttcaagaa	ctctgtagca	1860
ccgcctacat	acctcgctct	gctaatectg	ttaccagttg	ctgctgccag	tggcgataag	1920
tcgtgtctta	ccgggttgga	ctcaagacga	tagttaccgg	ataaggcgca	gcggtcggcg	1980
tgaacggggg	gttcgtgcac	acagcccaga	ttggagcgaa	cgacctacac	cgaactgaga	2040
tacctacagc	gtgagctatg	agaaagcgcc	acgcttcccg	aaggagagaa	ggcggacagg	2100
tatccggtaa	gcggcagggg	cggaacagga	gagcgcacga	gggagcttcc	agggggaaac	2160
gcctggtatc	tttatagtc	tgtcgggttt	cgccacctct	gacttgagcg	tcgatttttg	2220
tgatgctcgt	cagggggggc	gagcctatgg	aaaaacgcca	gcaacgcggc	cttttttacgg	2280
ttcctggcct	tttgctggcc	ttttgctcac	atgtaatgtg	agttagctca	ctcattaggg	2340
accccaggct	ttacacttta	tgcttccggc	tcgtatgttg	tgtggaattg	tgagcggata	2400
acaatttcac	acaggaaaaca	gctatgacca	tgattacgcc	aagctacgta	atacgaactca	2460
ctaggcgccc	gcgagtcgac	gaggccggcc	gattatcgac	attgattatt	gactgattat	2520
taatagtaat	caattacggg	gtcattagtt	catagcccat	atatggagtt	ccgcgttaca	2580
taacttacgg	taaatggccc	gcctggctga	ccgcccaacg	accccgccc	attgacgtca	2640
ataatgacgt	atgttcccat	agtaacgcca	atagggactt	tccattgacg	tcaatgggag	2700
gagtattttac	ggtaaactgc	ccacttgcca	gtacatcaag	tgtatcatat	gccaagtacg	2760
ccccctattg	acgtcaatga	cggtaaatgg	ccgcctggc	attatgccc	gtacatgacc	2820
ttacgggact	ttcctacttg	gcagtacatc	tacgtattag	tcategctat	taccatgggt	2880
cgaggtgagc	cccacgttct	gcttcaactct	ccccatctcc	ccccctccc	cacccccaat	2940
tttgtatttta	tttatttttt	aattattttt	tgacgcgatg	ggggcggggg	gggggggggg	3000
gcgcgccagg	cggggcgggg	cggggcgagg	ggcggggcgg	ggcgaggcgg	agaggtgcgg	3060
cggcagccaa	tcagagcggc	gcgctccgaa	agtttccctt	tatggcgagg	cggcggcggc	3120
ggcggcccta	taaaaagcga	agcgcgcggc	gggcgggagt	cgctgcgttg	ccttcgcccc	3180
gtgccccgct	ccgcgcgcgc	tcgcgcgcgc	cgccccggct	ctgactgacc	gcgttactcc	3240
cacaggtgag	cgggcgggac	ggcccttctc	ctccgggctg	taattagcgc	ttggtttaat	3300
gacggctcgt	ttcttttctg	tggtctgcgtg	aaagccttaa	agggctccgg	gagggcccctt	3360
tgtgcggggg	ggagcgggctc	ggggggtgcg	tgctgtgtgtg	tgtgcgtggg	gagcgccgcg	3420
tgcgcccgcc	gctgcccggc	ggctgtgagc	gctgcggggc	cggcgcgggg	ctttgtgcgc	3480
tccgcgtgtg	cgcgagggga	gcgcggccgg	gggcggtgcc	ccgcggtgcg	ggggggctgc	3540
gaggggaaca	aaggctgcgt	gcggggtgtg	tgcctggggg	ggtgagcagg	gggtgtgggc	3600
gcggcggtcg	ggctgtaacc	ccccctgca	ccccctccc	cgagttgctg	agcacggccc	3660
ggcttcgggt	gcggggctcc	gtgcggggcg	tggcgcgggg	ctcgccgtgc	cgggcggggg	3720
gtggcggcag	gtgggggtgc	cgggcggggc	ggggcgccct	cgggccgggg	agggctcggg	3780
ggagggggcg	ggcgggcccc	gagcgccggc	ggctgtcgag	gcgcggcgag	ccgcagccat	3840
tgccttttat	ggtaatcgtg	cgagagggcg	cagggacttc	ctttgtccca	aatctggcgg	3900
agccgaaatc	tgggagggcg	cgccgcaccc	cctctagcgg	gcgcggggcg	agcgggtgcg	3960
cgccggcgag	aaggaaatgg	gcggggaggg	ccttcgtgcg	tcgccgcgcc	gccgtccctt	4020
tctccatctc	cagcctcggg	gctgccgcag	ggggacggct	gccttcgggg	gggacggggc	4080
aggggggggt	tcggcttctg	gcgtgtgacc	ggcgagctcta	gagcctctgc	taaccatggt	4140
catgccttct	tctttttcct	acagctcctg	ggcaacgtgc	tggttggtgt	gctgtctcat	4200
cattttggca	aagaattcac	ctgccagacc	atgccaaaaa	agaagagaaa	ggtcatgaaa	4260
ccagtaacgt	tatacgatgt	cgcagagtat	gccggtgtct	cttatcagac	cgtttcccg	4320
gtggtgaacc	aggccagcca	cgtttctg	aaaacgcggg	aaaaagtgga	agcggcgatg	4380

gcggagctga	attacattcc	caaccgcgtg	gcacaacaac	tggcgggcaa	acagtcgttg	4440
ctgattggcg	ttgccacctc	cagtctggcc	ctgcacgcgc	cgtcgcaa	tgtcgcggcg	4500
attaaatctc	gcgccgatca	actgggtgcc	agcgttggtg	tgtcgatggt	agaacgaagc	4560
ggcgctgaag	cctgtaaagc	ggcgggtgcac	aatcttctcg	cgcaacgcgt	cagtgggctg	4620
atcattaact	atccgctgga	tgaccaggat	gccattgctg	tggaaagctgc	ctgcactaat	4680
gttccggcgt	tatttcttga	tgtctctgac	cagacaccca	tcaacagtat	tattttctcc	4740
catgaagacg	gtacgcgact	gggcgtggag	catctggtcg	cattgggtca	ccagcaa	4800
gcgctgttag	cgggccatt	aagttctgtc	tcggcgcgctc	tgcgtctggc	tggctggcat	4860
aaatatctca	ctcgcaatca	aattcagccg	atagcggaac	gggaaggcga	ctggagtgcc	4920
atgtccggtt	ttcaacaaac	catgcaa	ctgaatgagg	gcatcgttcc	cactgcgatg	4980
ctggttgcca	acgatcagat	ggcgctgggc	gcaatgcgcg	ccattaccga	gtccgggctg	5040
cgcgttggtg	cggatatctc	ggtagtggga	tacgacgata	ccgaagacag	ctcatgttat	5100
atcccgcgt	caaccacat	caaacaggat	tttcgcctgc	tggggcaa	cagcgtggac	5160
cgcttgctgc	aaactctctca	gggccaggcg	gtgaagggca	atcagctgtt	gcccgtctca	5220
ctggtgaaaa	gaaaaaccac	cctggcgccc	aatacgcaaa	ccgcctctcc	ccgcgcgttg	5280
gccgattcat	taatgcagct	ggcacgacag	gtttcccgac	tggaaagcgg	gcagtgagaa	5340
ttcactcctc	aggtgcaggc	tgccatcag	aagggtggtg	ctggtgtggc	caatgccctg	5400
gctcaca	accactgaga	tctttttccc	tctgccaaaa	attatgggga	catcatgaag	5460
ccccttgagc	atctgacttc	tggctaataa	aggaaattta	ttttcattgc	aatagtgtgt	5520
tggaattttt	tgtgtctctc	actcggaagg	acatatggga	gggcaa	tttaaa	5580
cagaatgagt	atttggttta	gagtttggca	acatatgcca	tatgctggct	gccatgaaca	5640
aaggtggcta	taaagaggtc	atcagtatat	gaaacagccc	cctgctgtcc	attccttatt	5700
ccatagaaaa	gccttgactt	gaggttagat	tttttttata	ttttgttttg	tgttattttt	5760
ttctttaaca	tccctaaaat	tttccttaca	tgttttacta	gccagatttt	tcctcctctc	5820
ctgactactc	ccagtcatag	ctgtccctct	tctcttatga	agatccctcg	acctgcagcc	5880
cagcccaagc	tcggggccag	gtcggccgag	cgatcgcgag	aattcggctt	aagtgagtcg	5940
tattacggac	tggcgcgtcg	tttacaacgt	cgtagctggg	aaaaccctgg	cgttacccaa	6000
cttaatcgcc	ttgcagcaca	tccccctttc	gccagctggc	gtaatagcga	agaggccccgc	6060
accgatcgcc	cttcccaaca	gttgcgcgagc	ctgaatggcg	aatggcgctt	cgcttggtaa	6120
taaagcccgc	ttcggcgggc	tttttttt				6148

<210> 14

<211> 5759

<212> DNA

<213> Artificial Sequence

<220>

<223> Construct Sequence

<400> 14

gcggccgcga	gtcgacgagg	cgggccgatt	aattaaggct	cgacattgat	tattgactag	60
ttattaatag	taatcaatta	cggggtcatt	agttcatagc	ccatatatgg	agttccgcgt	120
tacataactt	acggtaaatg	gcccgcctgg	ctgaccgccc	aacgaccccc	gccattgac	180
gtcaataatg	acgtatgttc	ccatagtaac	gccaataggg	actttccatt	gacgtcaatg	240
ggaggagtat	ttacggtaaa	ctgcccactt	ggcagtacat	caagtgtatc	atatgccaag	300
tacgccccct	attgacgtca	atgacggtaa	atggccccgc	tggcattatg	cccagtacat	360
gaccttacgg	gactttccta	cttggcagta	catctacgta	ttagtcatcg	ctattaccat	420
ggttcgaggt	gagccccacg	ttctgcttca	ctctcccat	ctccccccc	tccccacccc	480
caattttgta	tttatttatt	ttttaattat	tttgtgcagc	gatggggggcg	gggggggggg	540
gggcgcgcgc	caggcggggc	ggggcggggc	gaggggcggg	gcggggcgag	gcggagaggt	600
gcggcggcag	ccaatcagag	cggcgcgctc	cgaaagtttc	cttttatggc	gaggcggcgg	660
cggcgggcggc	cctataaaaa	gcgaagcgcg	cggcgggcgg	gagtcgctgc	gttgccctcg	720
ccccgtgccc	cgctccgcgc	cgctccgcgc	cgcccgcccc	ggctctgact	gaccgcgtta	780
ctcccacagg	tgagcggggc	ggacggccct	tctcctccgg	gctgtaatta	gcgcttggtt	840
taatgacggc	tcgtttcttt	tctgtggctg	cgtgaaagcc	ttaaagggtc	ccgggagggc	900
cctttgtgcg	ggggggagcg	gctcgggggg	tgcgtgcgtg	tgtgtgtgcg	tggggagcgc	960
cgcgtgcggc	cgcgctgcc	cggcggtcgt	gagcgctgcg	ggcgcggcgc	ggggctttgt	1020
gcgctccgcg	tgtgcgcgag	gggagcgcg	ccggggcgcg	tgcccccgcg	tgcgggggtg	1080
ctgcgagggg	aacaaaggct	gcgtgcgggg	tgtgtgcgtg	ggggggtgag	caggggggtg	1140
gggcgcggcg	gtcgggctgt	aacccccccc	tgcaccccc	gccccgagtt	gctgagcacg	1200
gccccgcttc	gggtgcgggg	ctccgtgcgg	ggcgtggcgc	ggggctcgcc	gtgccggggc	1260

gggggtggcg	gcaggtgggg	gtgccggggc	gggcggggcc	gcctcggggc	ggggagggct	1320
cgggggaggg	gcgcggcgcc	cccggagcgc	cggcggtgt	cgaggcgcg	cgagccgcag	1380
ccattgcctt	ttatggtaat	cgtgcgagag	ggcgagggga	cttcctttgt	cccaaatctg	1440
gcggagccga	aatctgggag	gcgcggccgc	acccctctta	gcgggcgcgg	gcgaagcggg	1500
gcggcgccgg	caggaaggaa	atgggcgggg	agggccttcg	tcgctcgccg	cgccgcgcgc	1560
cccttctcca	tctccagcct	cggggctgcc	gcagggggac	ggctgccttc	gggggggacg	1620
gggcagggcg	gggttcggct	tctggcgtgt	gaccggcggc	tctagagcct	ctgctaacca	1680
tgttcatgcc	ttcttctttt	tcctacagct	cctgggcaac	gtgctggttg	ttgtgctgtc	1740
tcatcatttt	ggcaaagaat	tcgccaccat	ggtgagcaag	ggcgaggagc	tgttcaccgg	1800
ggtggtgccc	atcctggtcg	agctggacgg	cgacgtaaac	ggccacaagt	tcagcgtgtc	1860
cggcgagggc	gagggcgatg	ccacctacgg	caagctgacc	ctgaagttca	tctgcaccac	1920
cggcaagctg	cccgtgcctt	ggcccaccct	cgtgaccacc	ctgacctacg	cgctgcagtg	1980
cttcagccgc	taccccgacc	acatgaagca	gcacgacttc	ttcaagtccg	ccatgcccga	2040
aggctacgtc	caggagcgca	ccatcttctt	caaggacgac	ggcaactaca	agaccgcgcg	2100
cgaggtgaag	ttcgagggcg	acaccctggg	gaaccgcctc	gagctgaagg	gcctgcactt	2160
caaggaggac	ggcaacatcc	tggggcacaa	gctggagtac	aactacaaca	gccacaacgt	2220
ctatatcatg	gccgacaagc	agaagaacgg	catcaaggtg	aacttcaaga	tccgccacaa	2280
catcgaggac	ggcagcgtgc	agctcgccga	ccactaccag	cagaacaccc	ccatcggcga	2340
cggccccgtg	ctgctgcccc	acaaccacta	cctgagcacc	cagtcgcgcc	tgagcaaaga	2400
ccccaacgag	aagcgcgac	acatggctct	gctggagtcc	gtgaccgcgc	ccgggatacc	2460
tctcggcatg	gacgagctgt	acaagtaaga	attcactcct	caggtgcagg	ctgcctatca	2520
gaaggtgggt	gctggtgtgg	ccaatgccct	ggctcacaaa	taccactgag	atctttttcc	2580
ctctgccaaa	aattatgggg	acatcatgaa	gccccttgag	catctgactt	ctggctaata	2640
aaggaaattt	atcttctattg	caatagtgtg	ttggaatttt	ttgtgtctct	cactcggaag	2700
gacatatggg	agggcaaatc	atttaaaaca	tcagaatgag	tatttggttt	agagtttggc	2760
aacatatgcc	atatgctggc	tgccatgaac	aaaggtgggt	ataaagaggt	catcagtata	2820
tgaacagcc	ccctgctgtc	cattccttat	tccatagaaa	agccttgact	tgaggttaga	2880
ttttttttat	atcttgtttt	gtgttatatt	tttctttaac	atccctaaaa	tttcccttac	2940
atgttttact	agccagattt	ttctctctct	cctgactact	cccagtcata	gctgtccctc	3000
ttctcttatg	aagatccctc	gacctgcagc	ccaagctcgg	ggccaggctc	ggcgagcgat	3060
cgcgagaatt	cggcttaagt	gagtcgtatt	acgactggc	cgctcgtttt	caacgtcgtg	3120
actgggaaaa	ccctggcggt	acccaactta	atcgccctgc	agcacatccc	cctttcgcca	3180
gctggcgtaa	tagcgaagag	gcccgcaccg	atcgcccttc	ccaacagttg	cgcagcctga	3240
atggcgaaat	gcgcttgcgt	tggtataaaa	gcccgccttc	gcgggctttt	ttttggttaa	3300
ctacgtcagg	tggcactttt	cggggaaatg	tgcgcggaac	ccctatattg	ttatttttct	3360
aaatacatct	aaatatgtat	ccgctcatga	gacaataacc	ctgataaatg	cttcaataat	3420
attgaaaaag	gaagagtatg	agtattcaac	atttcctgtg	cgcccttatt	cccttttttg	3480
cggcattttg	ccttctctgt	tttgctcacc	cagaaacgct	ggtgaaagta	aaagatgctg	3540
aagatcagtt	gggtgcacga	gtgggttaca	tcgaactgga	tctcaacagc	ggtaagatcc	3600
ttgagagttt	tcgccccgaa	gaacgttctc	caatgatgag	cactttttaa	gttctgctat	3660
gtggcgcggt	attatcccg	gttgacgcgc	ggcaagagca	actcggtcgc	cgcatacact	3720
attctcagaa	tgacttggtt	gagtactcac	cagtcacaga	aaagcatctt	acggatggca	3780
tgacagtaag	agaattatgc	agtgtgcc	taaccatgag	tgataacact	gcggccaact	3840
tacttctgac	aacgatcgga	ggaccgaagg	agctaaccgc	ttttttgcac	aacatggggg	3900
atcatgtaac	tcgccttgat	cgttggggac	cggagctgaa	tgaagccata	ccaaacgacg	3960
agcgtgacac	cacgatgcct	gtagcaatgg	caacaacggt	gcgcaacta	ttaactggcg	4020
aactacttac	tctagcttcc	cggcaacaat	taatagactg	gatggaggcg	gataaagttg	4080
caggaccact	tctgcgctcg	gcccttcggg	ctggctgggt	tattgctgat	aaatctggag	4140
ccggtgagcg	gggtctcgc	ggtatcattg	cagcaactgg	gccagatggg	aagccctccc	4200
gtatcgtagt	tatctacacg	acggggagtc	aggcaactat	ggatgaacga	aatagacaga	4260
tcgctgagat	agggtgcctca	ctgattaagc	attggtaact	gtcagaccaa	gtttactcat	4320
atatacttta	gattgattta	ccccggttga	taatcagaaa	agccccaaaa	acaggaagat	4380
tgtataagca	aatattttaa	ttgtaaacgt	taatattttg	ttaaaattcg	cgttaaattt	4440
ttgttaaata	agctcatttt	ttaaccaata	ggccgaaatc	ggcaaaatcc	cttataaatc	4500
aaaagaatag	cccagatatg	ggttgagtgt	tgttccagtt	tggaacaaga	gtccactatt	4560
aaagaacgtg	gactccaacg	tcaaagggcg	aaaaaccgtc	tatcagggcg	atggcccact	4620
acgtgaacca	tcacccaaat	caagtttttt	ggggctgagg	tgccgtaaa	cactaaatcg	4680
gaaccctaaa	gggagccccc	gatttagagc	ttgacgggga	aagcgaacgt	ggcgagaaag	4740
gaaggggaag	aagcgaaagg	agcgggcgct	agggcgctgg	caagtgtagc	ggtcacgctg	4800
cgcgtaacca	ccagcaccgc	cgcgcttaat	gcgcgcgtac	agggcgcgta	aaaggatcta	4860
ggtgaagatc	ctttttgata	atctcatgac	caaaatccct	taacgtgagt	tttcgttcca	4920

ctgagcgtca	gaccccgtag	aaaagatcaa	aggatcttct	tgagatcctt	tttttctgcg	4980
cgtaatctgc	tgcttgcaaa	caaaaaaacc	accgctacca	gcggtggttt	gtttgccgga	5040
tcaagagcta	ccaactcttt	ttccgaaggt	aactggcttc	agcagagcgc	agataccaaa	5100
tactgttctt	ctagtgtagc	cgtagttagg	ccaccacttc	aagaactctg	tagcaccgcc	5160
tacatacctc	gctctgctaa	tcctgttacc	agtggctgct	gccagtggcg	ataagtcgtg	5220
tcttaccggg	ttggactcaa	gacgatagtt	accggataag	gcgcagcggg	cgggctgaac	5280
gggggggttcg	tgcacacagc	ccagcttgga	gcgaacgacc	tacaccgaac	tgagatacct	5340
acagcgtgag	ctatgagaaa	gcgccacgct	tcccgaaggg	agaaaggcgg	acaggtatcc	5400
ggtaagcggc	agggtcggaa	caggagagcg	cacgagggag	cttccagggg	gaaacgcctg	5460
gtatctttat	agtcctgtcg	ggtttcgcca	cctctgactt	gagcgtcgat	ttttgtgatg	5520
ctcgtcaggg	gggcggagcc	tatggaaaaa	cgccagcaac	gcggcctttt	tacggttcct	5580
ggccttttgc	tggccttttg	ctcacatgta	atgtgagtta	gctcactcat	taggcacccc	5640
aggctttaca	ctttatgctt	cgggctcgta	tgttgtgtgg	aattgtgagc	ggataacaat	5700
ttcacacagg	aaacagctat	gaccatgatt	acgccaagct	acgtaatacg	actcactag	5759